

What is claimed is:

- 1           1.           A vacuum exhaust apparatus for exhausting gas from at least two  
2 process vacuum chambers, comprising:  
3           a sub-atmospheric chamber having at least two inlets and an outlet;  
4           a plurality of high-vacuum pumps, each said high-vacuum pump connected on  
5 an exhaust side to one of the inlets of the sub-atmospheric chamber, each said high-  
6 vacuum pump being connected on a vacuum side to one of the process vacuum  
7 chambers for controlling vacuum within that chamber; and  
8           a backing pump connected to the outlet of the sub-atmospheric chamber, for  
9 maintaining vacuum within that chamber.
- 1           2.           The vacuum exhaust apparatus of claim 1, further comprising a  
2 sub-atmospheric abatement device in the sub-atmospheric chamber for conditioning  
3 exhaust.
- 1           3.           The vacuum exhaust apparatus of claim 2, wherein the sub-  
2 atmospheric abatement device is a scrubber.
- 1           4.           The vacuum exhaust apparatus of claim 2, wherein the sub-  
2 atmospheric abatement device is a plasma device.
- 1           5.           The vacuum exhaust apparatus of claim 1, wherein the sub-  
2 atmospheric chamber is proximate the process chambers.
- 1           6.           The vacuum exhaust apparatus of claim 1, wherein the sub-  
2 atmospheric chamber is remote from the process chambers.

1           7.           The vacuum exhaust apparatus of claim 1, wherein an internal  
2 volume of the sub-atmospheric chamber reduces an effect of pressure changes in one  
3 of the process chambers on pressure in another of the process chambers.

1           8.           The vacuum exhaust apparatus of claim 1, wherein the high-  
2 vacuum pumps are turbo pumps.

1           9.           The vacuum exhaust apparatus of claim 1, wherein the high-  
2 vacuum pumps are turbo pumps capable of exhausting to a pressure of over 1 torr.

1           10.          The vacuum exhaust apparatus of claim 1, wherein the high-  
2 vacuum pumps are turbo pumps capable of exhausting to a pressure of over 5 torr.

1           11.          The vacuum exhaust apparatus of claim 1, further comprising  
2 throttle valves connected to exhaust sides of the high-vacuum pumps.

1           12.          The vacuum exhaust apparatus of claim 11, wherein the high-  
2 vacuum pumps are turbo pumps.

1           13.          The vacuum exhaust apparatus of claim 1, wherein the backing  
2 pump is proximate the sub-atmospheric chamber.

1           14.          The vacuum exhaust apparatus of claim 1, further comprising an  
2 atmospheric abatement device connected to an exhaust side of the backing pump.

1           15.          The vacuum exhaust apparatus of claim 14, wherein the  
2 atmospheric abatement device is a device selected from the group consisting of a wet  
3 scrubber, a dry scrubber and a combination dry/wet scrubber.

1           16.           The vacuum exhaust apparatus of claim 1, comprising four process  
2 vacuum chambers and four high-vacuum pumps.

1           17.           A semiconductor manufacturing system, comprising:  
2           a plurality of semiconductor vacuum processing chambers;  
3           a plurality of pressure control units, each said pressure control unit connected  
4 to one processing chamber for evacuating said chamber;  
5           a single sub-atmospheric abatement chamber connected to exhaust sides of  
6 each of said pressure control units, whereby all of said pressure control units exhaust  
7 into the single sub-atmospheric abatement chamber;  
8           abatement means in the sub-atmospheric abatement chamber for conditioning  
9 exhaust in the sub-atmospheric abatement chamber;  
10          a single backing pump connected to the sub-atmospheric abatement chamber  
11 for maintaining sub-atmospheric pressure in the sub-atmospheric abatement chamber;  
12 and  
13          an atmospheric abatement chamber connected to an exhaust of the backing  
14 pump.

1           18.           The semiconductor manufacturing system of claim 17, wherein  
2 said pressure control unit comprises a turbo pump connected for evacuating the one  
3 processing chamber, and a throttle valve connected to an exhaust side of the turbo  
4 pump.

1           19.           The semiconductor manufacturing system of claim 17, wherein the  
2 abatement means in the sub-atmospheric abatement chamber is a plasma device.

1           20.           The semiconductor manufacturing system of claim 17, wherein  
2 each of the plurality of pressure control units is connected directly to the sub-  
3 atmospheric abatement chamber.

1           21.           The semiconductor manufacturing system of claim 17, wherein  
2 each of the plurality of pressure control units is connected remotely to the sub-  
3 atmospheric abatement chamber.

1           22.           The semiconductor manufacturing system of claim 17, wherein  
2 each of the vacuum processing chambers is located within a clean room, and the sub-  
3 atmospheric abatement chamber is located outside the clean room.

1           23.           The vacuum exhaust apparatus of claim 17, wherein an internal  
2 volume of the sub-atmospheric chamber reduces an effect of pressure changes in one  
3 of the processing chambers on pressure in another of the processing chambers.

1           24.           A method for exhausting gas from a plurality of process vacuum  
2 chambers to achieve a process vacuum pressure, the method comprising the steps of:  
3           evacuating to an intermediate vacuum pressure greater than the process  
4 vacuum pressure, the process vacuum chambers and a sub-atmospheric abatement  
5 chamber, using a backing pump connected to an outlet of the abatement chamber;  
6           independently evacuating to the process vacuum pressure each of the process  
7 vacuum chambers using a plurality of high-vacuum pumps, each of said high-vacuum  
8 pumps being connected for evacuating one of the process vacuum chambers; each of  
9 said high-vacuum pumps further being connected for exhausting into inlets of said  
10 sub-atmospheric abatement chamber; and

11 conditioning exhaust in the sub-atmospheric abatement chamber using an  
12 abatement device.

1 25. The method of claim 24, further comprising the step of  
2 independently controlling a pressure in each said process vacuum chamber using a  
3 corresponding high-vacuum pump and a corresponding throttle valve at an exhaust  
4 side of each high-vacuum pump.

1 26. The method of claim 24, wherein the intermediate vacuum pressure  
2 is between 5 and 10 torr.